

10/511170

DT04 Rec'd PCT/PTO 14 OCT 2004

In re Appln. of KOJIMA et al.
Application No. Unassigned

CLAIM AMENDMENTS

1. (Currently Amended) A wavelength converting method ~~that wavelength converts a comprising passing light of a first wavelength through a non-linear optical crystal, characterized in that an atmosphere that is and outputting the light from an output surface of the non-linear crystal at a second wavelength different from the first wavelength, the output surface being in contact with a surface of said non-linear optical crystal from which the light that has been wavelength converted is outputted is a gas that is smaller in content of a gaseous ambients containing less nitrogen elements than air, and the wavelength conversion is conducted in the atmosphere.~~

2. (Currently Amended) ~~A~~ The wavelength converting method according to claim 1, ~~characterized in that wherein an incident end surface of the non-linear optical crystal to on which the light to be wavelength-converted is inputted incident and the outgoing end output surface of the non-linear optical crystal from which the wavelength-converted light is outputted are surrounded by in a gas gaseous ambient that is smaller in the content of contains less nitrogen elements than air, and the wavelength conversion is conducted in the gas.~~

3. (Currently Amended) ~~A~~ The wavelength converting method according to claim 1, ~~characterized in that an atmosphere wherein respective ambient that is are in contact with the an incident end surface of the non-linear optical crystal to on which the light to be wavelength-converted is inputted incident and an atmosphere that is in contact with an outgoing end the output surface of the non-linear optical crystal from which the wavelength-converted light is outputted are gases that contain are different components, respectively, and the wavelength conversion is conducted in the gases.~~

4. (Currently Amended) ~~A~~ The wavelength converting method according to claim 1, ~~characterized in that the gas including circulating the gaseous ambient that is smaller lower in the content of nitrogen elements than air is circulated.~~

5. (Currently Amended) ~~A~~ The wavelength converting method according to claim 4, ~~characterized in that including, after the gas that is smaller in the content of nitrogen elements than air gaseous ambient is supplied to the vicinity of at least the outgoing end output surface of the non-linear optical crystal, exhausting the gas is exhausted gaseous ambient.~~

6. (Currently Amended) ~~A~~ The wavelength converting method according to claim 1, characterized in that wherein the gas that is smaller in the content of nitrogen elements than air is a gas that is gaseous ambient contains no more than 10% or less in the by volume content of the gas containing nitrogen elements therein.

7. (Currently Amended) ~~A~~ The wavelength converting method according to claim 1, characterized in that wherein the non-linear optical crystal is a crystal including cesium.

8. (Currently Amended) ~~A~~ The wavelength converting method according to claim 1, characterized in that wherein the gas is a gas that gaseous ambient mainly contains any one of a rare gas, an oxygen gas, and a carbon dioxide gas.

9. (Currently Amended) ~~A~~ The wavelength converting method according to claim 3, characterized in that wherein the gas which is an atmosphere that is in contact with a surface of the non-linear optical crystal from which the wavelength converted light is outputted and smaller in the content of nitrogen elements than air gaseous ambient is a gas that mainly contains argon gas therein.

10. (Currently Amended) A wavelength converting device that wavelength-converts a light passed through a non-linear optical crystal, characterized by comprising a means for setting an atmosphere that is controlling a gaseous ambient in contact with a ~~an~~ output surface of ~~said~~ the non-linear optical crystal from which the light that has been wavelength-converted is outputted to a ~~gas that is smaller in content of so the gaseous ambient contains less nitrogen elements~~ than air.

11. (Currently Amended) ~~A~~ The wavelength converting device according to claim 10, characterized in that wherein the wavelength-converted light that is output is at least 5 W or higher in mean power is outputted.

12. (Currently Amended) ~~A~~ The wavelength converting device according to claim 10, characterized by further comprising a means for surrounding an incident end surface of the non-linear optical crystal to on which the light to be wavelength-converted is inputted incident and an outgoing end the output surface of the non-linear optical crystal from which

~~the wavelength converted light is outputted by with a gas gaseous ambient that is smaller lower in the content of nitrogen elements than air.~~

13. (Currently Amended) ~~A~~ The wavelength converting device according to claim 10, characterized by further comprising a means for setting an atmosphere that is controlling respective gaseous ambients in contact with the an incident end surface of the non-linear optical crystal to on which the light to be wavelength-converted is inputted incident and an atmosphere that is in contact with the outgoing end output surface of the non-linear optical crystal from which the wavelength converted light is outputted to gases that contain so that the gaseous ambients are different components, respectively.

14. (Currently Amended) ~~A~~ The wavelength converting device according to claim 10, characterized by further comprising a means for allowing circulating the gas that is smaller in the content of nitrogen elements than air to be circulated gaseous ambient.

15. (Currently Amended) ~~A~~ The wavelength converting device according to claim 14, characterized in that wherein the non-linear optical crystal is disposed within a vessel in which including a window or an opening that allows an incident light or an outgoing light to pass therethrough is partially disposed, and a means for supplying a gas which is smaller lower in the content of nitrogen elements than air to the vicinity of at least the outgoing end output surface of the non-linear optical crystal within said vessel, and a means for exhausting said supplied gas from said vessel are provided.

16. (Currently Amended) ~~A~~ The wavelength converting device according to claim 10, characterized in that wherein the gas that is smaller in the content of nitrogen elements than air is a gas that is gaseous ambient contains no more than 10% or less in the by volume content of the gas containing nitrogen elements therein.

17. (Currently Amended) ~~A~~ The wavelength converting device according to claim 10, characterized in that wherein the non-linear optical crystal is a crystal including cesium.

18. (Currently Amended) ~~A~~ The wavelength converting device according to claim 10, characterized in that wherein the gas that is smaller in the content of nitrogen elements than air gaseous ambient is a gas that mainly contains anyone of a rare gas, an oxygen gas, and a carbon dioxide gas.

19. (Currently Amended) ~~A~~ The wavelength converting device according to claim 13, characterized in that wherein the gas which is an atmosphere that is gaseous ambient in contact with a the output surface of the non-linear optical crystal from which light is outputted and smaller in the content of nitrogen elements than air is a gas that mainly contains argon gas therein.

20. (Currently Amended) A laser machining device comprising a machining device, a laser device which is a light source for wavelength conversion as a machining light source, and a means for ~~setting an atmosphere which is controlling an ambient~~ in contact with a surface of a non-linear optical crystal from which a wavelength-converted light is outputted to a ~~gas which is smaller in the content of, so the ambient contains less nitrogen elements~~ than air, and a wavelength converting device that wavelength-converts a laser beam from said laser device and passing through ~~said~~ the non-linear optical crystal.